Creative Errors in the Writing of Deaf Children[1]

Jonnie E. Geis

1. The Problem.

Deaf children face a problem in language acquisition that is shared by no other population. It seems reasonable to assume that they receive little, if any, linguistic input before beginning their formal education, generally at age five or six, and that after that point their linguistic input is primarily limited to classroom and reading materials that can be presented visually. As a result, the language acquisition of these children is greatly delayed, and few of them ever produce and understand all of the syntactic constructions and processes of adult English.

In their writing, deaf children produce a number of grammatical constructions that differ significantly from any constructions of adult English. Since the children can be assumed not to have had models for the production of these constructions, proponents of the innateness hypothesis must assume them to be creative errors. By a "creative error" I mean the incorrect, though consistent, use of a linguistic structure to represent a certain meaning. I will describe and attempt to characterize, in terms of syntactic rules, the most frequent creative errors that have been found to occur in the writings of these children in two areas of English syntax, conjunction and relativization, and I will investigate the implications of these errors for the theory of language acquisition.

2. The Writing Samples

The data used in this study were taken from writing samples collected as part of a five-year Office of Education project and are currently being analyzed syntactically as part of a second five-year project.[2] The results I will report came after a year of preliminary linguistic analysis of samples from nearly five hundred subjects ages ten through eighteen. The samples were collected over a five-year period in state schools for the deaf in all geographical areas of the country (each child writing one sample every year) and were elicited with a series of pictures as stimuli. The creative errors described below were found in the samples from a large percentage of the population and were not confined to any area of the country or any one type of school (residential, day, public, private, etc.). Thus the errors seem typical of the linguistic behavior of the population of deaf children in this country.

3. Conjunction Errors

All but a few of the subjects used conjoined sentences and conjoined phrases with and in their samples. Conjoined subjects appeared earliest, in samples written by ten-year-olds, while the other types of conjunction (conjoined sentences, verb phrases, and direct objects) appeared later, at ages twelve or thirteen for most of the subjects. These are the types of grammatical English conjoined structures that appeared most frequently. Sentences (1)-(4) are examples.

(1) The boy and the girl went to the store.
(2) The boy bought some lemons, and the girl squeezed them.
(3) The boy bought some lemons and made lemonade.
(4) The boy bought some lemons and a pitcher.

There is one other type of conjoined structure that is quite frequent in adult English--conjoined verbs sharing a subject and an object, as in (5).

(5) The boy cut and squeezed the lemons.

The fact that sentences of this sort do not appear in the samples presents a significant deviation of the subjects' conjunction from that of adult Engish, since conjoined verbs can be analyzed as produced by the same Conjunction Reduction schema as the conjoined phrases in (1), (3), and (4).[3] The absence of sentences like (5) could be treated as an accidental gap in the data; however, the high frequency of types (1)-(4) casts doubt on such a treatment, as does the fact that all of the subjects wrote descriptions of a picture sequence for which sentence (5) would be quite appropriate.

Even more significant than the absence of type (5) is the fact that there are two types of conjoined sentences which appear very frequently in the samples starting at ages twelve and thirteen that are not acceptable in adult English and for which the children cannot be claimed to have had models. Sentences (6) and (7) are examples of these.

(6) The boy bought some lemons and the girl washed.
(7) The boy threw the ball and bounced over the fence.

The meanings of such sentences are clear from the contexts of the samples and from the pictures the children were asked to describe; (6) means that the girl washed the lemons, while (7) means that the ball bounced over the fence.

It should be pointed out that conjunction is the method of sentence combination most often used by the subjects and that sentences like (6) and (7) appeared in the writing of at least half of the subjects. What is needed is an explanation of these

differences between adult English conjunction and deaf children's conjunction. Why are (6) and (7), but not (5) used by deaf children? Let us look at the conditions under which phrases conjoined with and can be formed in adult English and see at what points (6) and (7) violate these conditions. I will assume that all the sentences above containing conjoined phrases, both for adult English and for the written language of the subjects, are to be derived from full conjoined sentences by some syntactic reduction process. For example, a sentence with a conjoined object, like (4) above, will be assumed to be derived from the same underlying structure as (8).

(8) The boy bought some lemons, and the boy bought a pitcher.

There are two conditions which a full conjoined sentence must meet if Conjunction Reduction is to apply to it, conditions A and B; and there is one condition which the reduced sentence resulting from Conjunction Reduction must meet, condition C.

Condition A: The identical elements in the two conjoined sentences must be in the same position and have the same constituency--i.e., both must be subjects, or both must be verb phrases, etc.

Condition B: The identical elements must be positioned at one or the other end of their respective sentences.[4]

Condition C: The element in the derived sentence which corresponds to the identical elements in the source sentence must be positioned at one or the other end of the derived sentence.

Condition C describes the effects of the schema, representing the fact that a copy of the identical element is made at the beginning or end of the sentence, depending on the position of the identical elements in the source sentence. The derived constituent structure of the sentences will not be considered, since there is no way to determine the constituent structure of the sentences in the samples.

These conditions are satisfied by all of sentences (1), (3) - (5), and the conjoined sentences assumed to underlie them, but they are not satisfied by sentences (6) and (7). Sentence (6) violates condition C, while (7) violates conditions A and C. Notice that (9) is the source sentence for (6), repeated below, and that (10) is the source sentence for (7), also repeated. The identical elements are underlined.

(9) The boy bought some lemons, and the girl washed the lemons.
(6) The boy bought some lemons, and the girl washed.

(10) The boy threw the ball, and the ball bounced over the fence.
(7) The boy threw the ball and bounced over the fence.

From this discussion it seems that the English Conjunction Reduction schema cannot properly describe the abbreviations of conjoined sentences that are allowed by deaf children. It predicts the appearance of one kind of abbreviation that doesn't appear, sentence (5), repeated below, from a source like (11),

(11) The boy cut the lemons, and the boy squeezed the lemons.
(5) The boy cut and squeezed the lemons.

and it predicts the non-appearance of two kinds that do in fact appear, (6) and (7).

All but one of the occurring abbreviation types can be described by a syntactic process much simpler than the complex Conjunction Reduction schema, a process which deletes the second of two identical elements across the conjunction and. For example, sentences like (3), (4), (6), and (7) could be derived by such a process from the following source sentences, simply by deletion of the parenthesized elements:

(12) The boy bought some lemons, and (the boy) made lemonade.
(8) The boy bought some lemons, and (the boy bought) a pitcher.
(9) The boy bought some lemons, and the girl washed (the lemons).
(10) The boy threw the ball, and (the ball) bounced over the fence.

The four types of abbreviations above all can be described as identity deletion of a noun phrase of a sequence of words beginning with a noun phrase.[5] No cases of conjoined structures have been found whose derivation from full conjoined sentences would involve identity deletion of a verb or a sequence of words beginning with a verb--thus there are no sentences in the samples like (13) or (14).

(13) The boy bought some lemons and the girl some sugar.[6]
(14) The boy went to the store and the girl.

The following deletion rule would allow the derivation of all the conjoined phrases mentioned above that are found in the samples, with the exception of conjoined subjects, but not of the conjoined structures not found.

(15) SD: $[_S X - \underbrace{NP - Y}_{} - Z\ _S]$ and $[_S T - \underbrace{NP - Y}_{} - W\ _S]$

SI: 1 - 2 - 3 - 4 - 5 - 6 - 7

SC: 1 - 2 - 3 - 4 - 5 - ∅ - 7

condition: $2 \equiv 6$

The claim that the subjects' grammar contains a rule such as (15) predicts that certain other types of non-English conjoined constructions should be possible. For instance, it should be possible for the subjects to delete the object of the second sentence under identity with the subject of the first, as in (16), or to perform two deletions, as in (17).

(16) The ball rolled under the house and dog picked up.
(17) The boy cut the lemons and squeezed.

Note that sentence (17) is what the deletion analysis predicts from the source sentence (11) above instead of the non-occurring English sentence (5). Both sentence types (16) and (17) occur in the samples, though less frequently than the kinds mentioned above.

The one type of conjoined phrase that appears in the samples but cannot be derived by the deletion rule is conjoined subjects, as in (1).

(1) The boy and the girl went to the store.

The occurrence of conjoined subjects might be taken as refuting the deletion analysis; however, there are two facts about the conjoined-subject sentences in the samples that militate against treating them as syntactically parallel to other sentences containing conjoined phrases.

First, the children produce conjoined subjects at least two years earlier than any other type of conjunction. Recall that conjoined sentences and conjoined phrases of other kinds appear at age twelve or thirteen, while conjoined subjects appear at age ten. Second, the contexts in which conjoined-subject sentences are used are those where phrasal rather than sentence conjunction would be expected in adult English, and the verbs that occur in conjoined-subject sentences are among those that allow phrasal conjunction in adult English.[7] For instance, sentence (1) above refers to one act of "going", not to two trips. Another very frequent sentence in the samples is (18), which can be assumed, from the stimulus pictures, to refer to an act performed by the boy and the girl together, and not to acts performed by each separately.

(18) The boy and the girl made some lemonade.

So far I have found no cases of conjoined subjects that would be interpreted as sentence conjunction in adult English. The conjoined objects in the samples sometimes have a phrasal conjunction sense, sometimes a sentence-conjunction sense. All other conjunction types seem to require the sentence-conjunction interpretation, with two different actions involved. Thus it seems reasonable to analyze sentences with conjoined subjects differently from sentences with other conjoined phrases, possibly assigning them a phrasal conjunction source. However, I know of no other evidence in the samples that could be taken to support such an analysis.

The deletion rule proposed here for conjoined phrases derives these phrases in a very different way from the Conjunction Reduction schema of adult English; however, there is a very common syntactic process of adult English which to some extent parallels the deletion process in the language of the deaf subjects--Pronominalization. Adult English allows Pronominalization in each context where the samples show deletion of a noun phrase. Thus the parenthesized pronouns in the following sentences make them acceptable for adult English; these sentences appear in the samples both with and without pronouns, showing that Pronominalization as well as identity deletion of noun phrases is possible in the subjects' writing.

(19) The boy bought some lemons, and (he) made lemonade.
(20) The boy bought some lemons, and (he) bought a pitcher.
(21) The boy bought some lemons, and the girl washed (them).
(22) The boy threw the ball, and (it) bounced over the fence.
(23) The ball rolled under the house, and the dog picked (it) up.
(24) The boy cut the lemons, and (he) squeezed (them).

The claim that I would like to make about the conjunction abbreviation process of the subjects, then, is that it is an identity deletion rule whose applicability parallels that of English Pronominalization.[8] Since the subjects allow Pronominalization and deletion in the same environments, it seems reasonable to treat them as two variants of one process. The implications of this analysis of conjunction abbreviation will be discussed after consideration of another type of creative error that appears in the samples.

4. Relativization Errors

Relative clauses appear in the writing samples far less frequently than the syntactically less complex conjoined constructions. The majority of the subjects use at least a few

simple relatives in their five writing samples, but some never use any. On the other hand, questions, whose syntactic derivation is quite similar to that of relatives, are understood very early by the subjects and used very frequently. Relatives formed by use of a subject wh-word, such as the one in (25), first appear at age twelve, while those formed by fronting an object wh-word, such as the one in (26), appear one or two years later and are far less frequent than the former type.[9]

(25) She looked at the boy who dropped the bat.
(26) The farmer pulled the rope which Ken held.

There are several non-English relative clause constructions in the samples, the easiest to interpret being cases of object-fronted relatives which contain an extra noun phrase or pronoun. Examples are (27)-(29).

(27) John and James pulled the rope which Ken hold it.
(28) The dog picked up the ball which the boy threw it.
(29) The little boy got off the car and ran to the dog which he later kneeled hugging the dog.

Sentences somewhat like these occur in some dialects of English and have been discussed by Ross (1967). Whereas in normal English relativization a noun phrase is moved to the front of the relative clause, in the dialects Ross considered and in the writing of the subjects the noun phrase is copied at the front of the clause, the original noun phrase remaining behind and usually being pronominalized. In Ross's terminology, the derivations of (27)-(29) would involve a "copying" rule rather than the English "chopping" rule. Another interpretation of the difference between (27)-(29) and adult English sentences containing object-fronted relatives will be proposed below.

The interesting thing about object-fronted relatives in the writing samples is that nearly all of them contain the noun phrase or pronoun in object position; very few are well-formed in terms of adult English. Moreover, "copying" never occurred in object-fronted questions, as might be expected from the derivational similarity between questions and relative clauses. No questions like (40) were found.

(40) What did the boy find it?

5. Implications

As was mentioned earlier, proponents of the innateness hypothesis generally assume that errors such as those described above reflect whatever is innate about the structure of language or the child's capacity for learning language. I will assume that some form of the innateness hypothesis is correct and attempt to assign a source to the types of errors discussed. In particular,

I will be interested in which of two versions of the innateness hypothesis of language acquisition these errors are consistent with. On one version of the hypothesis, children are viewed as bringing certain innate strategies to bear upon their linguistic input with the result that they "discover" the rules that characterize the constructions in the language. On the other version of the hypothesis, children are viewed as possessing a universal set of rules and bringing their linguistic input to bear upon these rules, with the result that they "discover" which of the universal rules are relevant in their language, the precise shapes of these rules, how they must be restricted, and how they must be ordered.

Thus the two versions of the hypothesis differ in what they claim is innate; but they also make different predictions about the kinds of output that will be found during acquisition. The former predicts, among other things, that creative errors will be made that result from over-generalization of the adult English rules; the latter, on the other hand, predicts that creative errors will be made as a result of failure to correctly restrict one of the universal set of innate rules. The second description rather than the first seems to fit the errors discussed above, although this conclusion depends crucially upon two theoretical assumptions about the relationship between two types of syntactic processes, pronominalization and deletion. Since little evidence has as yet been advanced in support of this hypothesis, the conclusion I reach will necessarily be quite tentative.

I have suggested that the conjunction abbreviation rule is an identity deletion rule and that Identity Deletion and Pronominalication are variants of one syntactic process in the language of the subjects. A number of claims have been made recently to the effect that Pronominalization and identity deletion rules in English and other languages are related, Pronominalization involving deletion of some material from a noun phrase under identity, identity deletions involving deletion of all the material. It has further been claimed that Pronominalization must in at least some cases apply as a condition for later application of deletion.[10] The fact that Pronominalization and some identity-deletion rules share the same constraints aruges in favor of the view that the two rule types are actually variants of one kind of syntactic process.[11]

If Pronominalization can be shown to be a restricted form of a universal identity-deletion rule, then the conjunction abbreviation errors in the samples will be analyzable as failure on the part of the subjects to correctly restrict this universal deletion rule to Pronominalization. However, if Pronominalization and identity-deletion are simply viewed as two similar types of rules, not crucially related by syntactic theory, then the conjunction abbreviation errors will have to be analyzed as overgeneralization of an identity-deletion rule or as the use of a rule not present in the grammar of adult English. The implications of the conjunction abbreviation errors thus depend on the eventual

settlement of the question of the relationship between Pronominalization and deletion rules in syntactic theory.

The implications of the copying errors in relativization are clearer but depend upon the way in which rules like wh-movement are formalized in syntactic theory. There are two alternative ways of formalizing such rules--first, as one-step movement processes, or, second, as two-step processes which involve copying an element and then deleting the original. Ross (1967) did not attempt to determine which of these formalizations of variable-movement rules is correct, but only the second yields an interpretation of the "copying" dialect of adult English and the "copying" errors in the writing samples which relates these in an interesting way to relativization in adult English.[12]

The most reasonable way of analyzing the "copying" sentences, such as (27), repeated here, is to claim that they are derived by making a wh-copy at the left boundary of the relative clause of the noun phrase in the relative clause that is identical to the head noun phrase, then pronominalizing the original occurrence of this noun phrase.

(27) John and James pulled the rope which Ken hold it.

The derivation of (27) according to this analysis would take a structure like (41) and convert it first to (42) and then to (27).

(41) John and James pulled $[_{NP}$ the rope $[_{S}$ Ken hold the rope.$_{S}]_{NP}]$

(42) John and James pulled $[_{NP}$ the rope $[_{S}$ which Ken hold the rope.$_{S}]_{NP}]$

In the derivation of some of these "copying" sentences, Pronominalization doesn't occur, for example (29) above, and the sentence retains a full noun phrase within the relative clause rather than a pronoun.

If this analysis of the "copying" sentences is correct, and if we assume the second of the two formalizations of movement rules outlined above, i.e., that they proceed by copying and then deletion, then the only difference between the "copying" relative clauses and the relative clauses of adult English will be that in the former cases the original occurrence of the noun phrase is pronominalized, while in the latter cases it is also deleted. Thus it will be possible in view the "copying" relatives as produced by a failure on the part of the subjects to properly restrict relativization to deletion of the original noun phrase. I see no way in which the "copying" relatives can be interpreted as overgeneralizations of some English process.

In the conjunction abbreviation errors the subjects delete where Pronominalization is required in adult English, while in the relativization errors they pronominalize where deletion is required. Of course, my analysis of the relativization errors depends, like

my analysis of the conjunction errors, on the relationship between Pronominalization and deletion in syntactic theory. Given the assumption that Pronominalization is a restricted form of deletion, the conjunction errors are produced by failure to restrict the deletion process enough, while the relativization errors are produced by too great a restriction on the deletion process.

In conclusion, I have claimed that the conjunction and relativization errors discussed should be viewed as resulting from failure on the part of the subjects to properly restrict a universal syntactic process, Identity Deletion. This claim, however, has been shown to depend upon two theoretical assumptions that have not yet been thoroughly substantiated--that Pronominalization is a restricted form of a universal process of deletion, and that movement rules like wh-Movement are to be formalized as proceeding by copying and deletion. The existence of these two types of errors, if interpreted as resulting from failure to properly restrict universal rules, provides support for the version of the innateness hypothesis which claims that children possess a set of universal syntactic processes and bring linguistic input to bear upon these processes to restrict and order them.

Footnotes

1. The form of this paper was influenced by discussions with Michael L. Geis.

2. The analysis of the writing samples was supported by Grant No. OEG-0-9-232175-4370(607) from the United States Office of Education, Bureau of Education of the Handicapped.

3. The Conjunction Reduction schema has been described by Schane (1966) and Ross (1967).

4. There is another rule of English, Gapping, which abbreviates full conjoined sentences not meeting condition B--sentences in which the identical elements are verbs preceded and followed by lexical material.

5. The samples contain some sentences which might be described as derived by deletion of a second tense element on identity with a first. Examples are (i) and (ii).

(i) The boy threw the ball, and it bounce over the fence.
(ii) The woman saw the boy who drop the ball.

Such sentences are not very frequent and will not be considered here.

6. Sentence (13) in adult English is derived by Gapping, not by Conjunction Reduction. No constructions appear in the samples which could be claimed to be derived by Gapping.

7. The differences between phrasal and sentence conjunction are outlined in Lakoff and Peters (1969).

8. The subjects' use of Pronominalization does not in fact exactly parallel adult English Pronominalization. Forwards

Pronominalization is the only type that occurs in the samples. Although sentence-initial adverbial subordinate clauses are quite frequent, providing many environments where backwards Pronominalization would be possible in adult English, not a single case was found in the samples.

9. Object-fronted relatives could be claimed to be syntactically more complex than subject-fronted relatives in that the derivation of the former, but not of the latter, involves a change in the linear order of formatives.

10. See Langacker (1969) and Postal (1968). In two lectures at The Ohio State University in the fall of 1971, David Perlmutter argued that Pronominalization is a prerequisite for certain syntactic deletions in Slovenian.

11. Paul Postal (1968) showed that the rule of Equi-NP-Deletion can apply only in environments where Pronominalization can apply. Another deletion rule that obeys Langacker's (1969) constraints on Pronominalization is Verb Phrase Deletion. In Japanese, and possibly in other languages as well, Pronominalization is effected by a rule which deletes, rather than pronominalizing, one of two coreferential noun phrases.

12. Drachman (1970) has claimed that the formation of relative clauses always involves copying, pronominalization, and deletion rather than simple movement.

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